WHAT IS CLAIMED IS:

1. An engineered microparticle comprising:

a conductive core; and

an insulating self-assembled monolayer coating the conductive core, the monolayer having a thickness sufficient to render the microparticle maneuverable by dielectrophoresis.

2. The microparticle of claim 1, wherein the conductive core comprises an insulator coated with a conducting shell.

3. The engineered microparticle of claim 1, wherein the conductive core comprises gold, silver, platinum, or copper.

4. The engineered microparticle of claim 1, wherein the self-assembled monolayer comprises an alkanethiol self-assembled monolayer.

5. The engineered microparticle of claim 1, wherein the self-assembled monolayer comprises a phospholipid self-assembled monolayer.

6. The engineered microparticle of claim 1, further comprising a linking element coupled to the microparticle.

7. The engineered microparticle of claim 6, wherein the linking element comprises an antibody, single chain antibody, peptide, hormone, nucleic acid sequence, therapeutic drug, antibiotic, or a chemically-reactive compound.

8. An apparatus for binding to an analyte, the apparatus comprising:

an engineered microparticle comprising:

a conductive core;

an insulating layer coating the conductive core, the insulating layer having a thickness sufficient to render the apparatus maneuverable by dielectrophoresis; and

a linking element coupled to the engineered microparticle.

9. The apparatus of claim 8, wherein the linking element comprises an antibody, single chain antibody, peptide, hormone, nucleic acid sequence, therapeutic drug, antibiotic, or a chemically-reactive compound.

10. The apparatus of claim 8, further comprising a label coupled to the linking element.

11. The apparatus of claim 10, wherein the label comprises a fluorescent marker, a chromophore, a luminescent marker, or an enzyme.

12. An apparatus maneuverable by dielectrophoresis, comprising:

an insulating core coated with a conducting shell;

a first self-assembled monolayer coating the conducting shell; and

a second self-assembled monolayer coating the first self-assembled monolayer.

13. The apparatus of claim 12, wherein the first self-assembled monolayer comprises an alkanethiol self-assembled monolayer.

14. The apparatus of claim 13, wherein the second self-assembled monolayer comprises a phospholipid self-assembled monolayer.

15. The apparatus of claim 14, wherein the insulating core comprises polystyrene.

16. The apparatus of claim 12, further comprising a linking element coupled to the apparatus.

17. The apparatus of claim 16, wherein the linking element comprises an antibody, single chain antibody, peptide, hormone, nucleic acid sequence, therapeutic drug, antibiotic, or a chemically-reactive compound.

18. The apparatus of claim 16, further comprising a label coupled to the linking element.

19. A method for detecting a complex within a sample, the method comprising:

admixing with the sample an engineered microparticle having a first dielectric property and comprising a conductive core, an insulating layer having a thickness sufficient to render the microparticle maneuverable by dielectrophoresis, and a linking element;

associating the engineered microparticle with a target analyte to form the complex, the complex having a second dielectric property; and

detecting the complex by distinguishing between the first and second dielectric properties.

20. The method of claim 19, wherein the sample comprises blood, urine, saliva, amniotic fluid, biopsy, cell suspension, cell lysate, chromatographic fraction, or conditioned media.

21. The method of claim 19, wherein the sample comprises water, food, food processing, food distribution, mineral, or ore.

22. The method of claim 19, wherein the linking element comprises an antibody, single chain antibody, peptide, hormone, nucleic acid sequence, therapeutic drug, antibiotic, or a chemically-reactive compound.

23. The method of claim 19, wherein the insulating layer comprises one or more self-assembled monolayer layers.

24. A method for manipulating a complex in a sample, the method comprising:

admixing with the sample an engineered microparticle comprising a conductive core, an insulating layer coating the conductive core and having a thickness sufficient to render the engineered microparticle maneuverable by dielectrophoresis, and a linking element;

associating the engineered microparticle with the target analyte to form the complex; and

manipulating the complex using dielectrophoresis.

25. The method of claim 24, wherein the sample comprises blood, urine, saliva, amniotic fluid, biopsy, cell suspension, cell lysate, chromatographic fraction, or conditioned media..

26. The method of claim 24, wherein the sample comprises water, food, food processing, food distribution, mineral, or ore..

27. The method of claim 24, wherein the manipulating comprises sorting.

28. The method of claim 24, wherein the manipulating comprises separating.

29. The method of claim 24, wherein the manipulating comprises purification of the sample.

30. The method of claim 24, wherein the manipulating comprises trapping.

31. The method of claim 24, wherein the linking element comprises an antibody, single chain antibody, peptide, hormone, nucleic acid sequence, therapeutic drug, antibiotic, or a chemically-reactive compound.

32. The method of claim 24, wherein the insulating layer comprises one or more self-assembled monolayer layers.

33. A method for identifying one or more complexes within a sample, the method comprising:

admixing with the sample a plurality of engineered microparticles, each microparticle having a different dielectric property;

associating the plurality of engineered microparticles with one or more target analytes to form one or more complexes; and

identifying the one or more complexes by distinguishing between the different dielectric properties.

34. The method of claim 33, wherein each the plurality of engineered microparticles comprise a conductive core and an insulating layer.

35. The method of claim 34, wherein the insulating layer comprises one or more self-assembled monolayer layers.